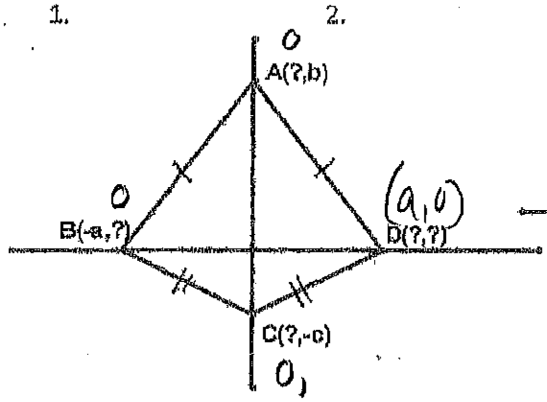
Mrs. Hayden

5.1 Coordinate Geometry WS

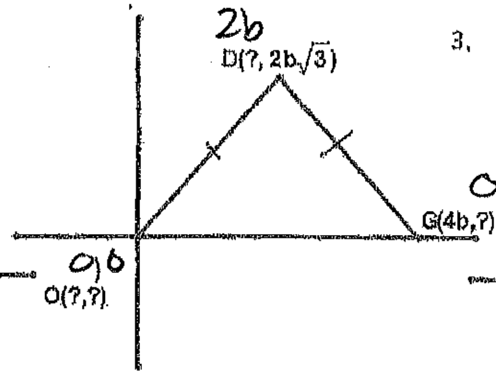
Name Key

What are the coordinates of the following figures?

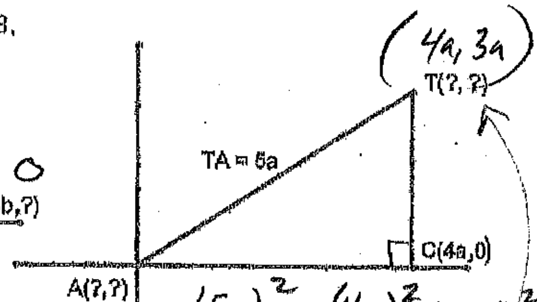
1.



2.



3.



$(5a)^2 = (4a)^2 + TC^2$

$25a^2 = 16a^2 + TC^2$

$9a^2 = TC^2$

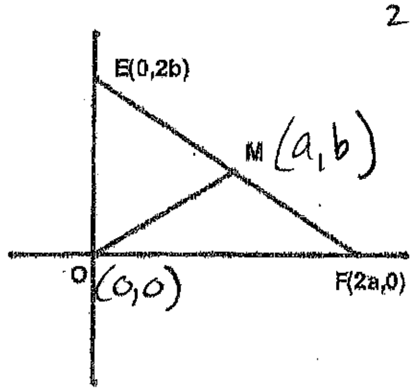
$3a = TC$

4. Given: ΔOEF is a right triangle.

M is the midpoint of $\overline{EF}$.

Prove: EM=FM=OM.

$\frac{0+2a}{2}, \frac{0+2b}{2}$



$EM = \sqrt{(a-0)^2 + (b-2b)^2}$

$EM = \sqrt{a^2+b^2}$

$FM = \sqrt{(2a-a)^2 + (0-b)^2}$

$FM = \sqrt{a^2+b^2}$

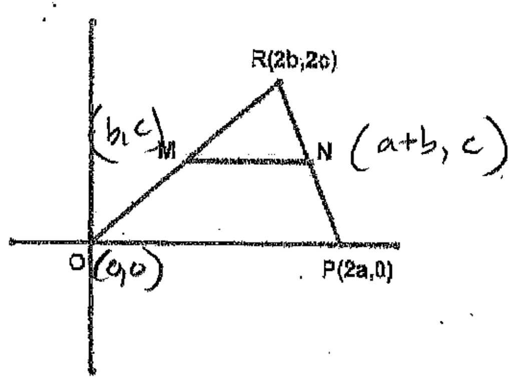
$OM = \sqrt{(a-0)^2 + (b-0)^2}$

$OM = \sqrt{a^2+b^2}$

EM = FM = OM ✓

5. Given: $\overline{MN}$ is the midsegment of ΔORP

Prove: $\overline{MN} \parallel \overline{OP}$, MN = $\frac{1}{2}$(OP)



$\overline{MN}$ $m = \frac{c-c}{a+b-b} = \frac{0}{a} = 0$

$\overline{OP}$ $m = \frac{0-0}{2a-0} = \frac{0}{2a} = 0$

$\overline{MN} \parallel \overline{OP}$ b/c same slope ✓

$MN = \sqrt{(a+b-b)^2 + (c-c)^2}$

$\sqrt{a^2} = a$

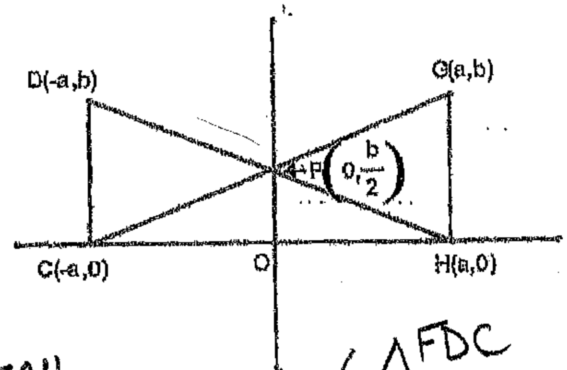
$OP = \sqrt{(2a-0)^2 - (0-0)^2} = 2a$

$\sqrt{4a^2} = 2a$

$a = \frac{1}{2}2a \therefore MN = \frac{1}{2}OP$ ✓

6. Given: diagram

Prove: $\triangle FGH \cong \triangle FDC$



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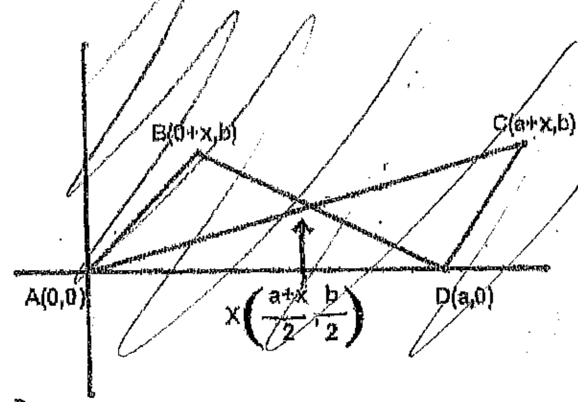
(7.) Given: diagram

Prove: ~~$\triangle ABX \cong \triangle CDX$~~



$\triangle FGH$

$FG = \sqrt{(a-0)^2 + \left(b-\frac{b}{2}\right)^2}$

$FG = \sqrt{a^2 + \frac{b^2}{4}}$

$FH = \sqrt{(a-0)^2 + \left(0-\frac{b}{2}\right)^2}$

$FH = \sqrt{a^2 + \frac{b^2}{4}}$

$GH = \sqrt{(a-a)^2 + (b-0)^2}$

$GH = b$

$\triangle FDC$

$FD = \sqrt{(0--a)^2 + \left(\frac{b}{2}-b\right)^2}$

$FD = \sqrt{a^2 + \frac{b^2}{4}}$

$FC = \sqrt{(0--a)^2 + \left(\frac{b}{2}-0\right)^2}$

$FC = \sqrt{a^2 + \frac{b^2}{4}}$

$DC = \sqrt{(-a--a)^2 + (b-0)^2}$

$DC = b$

$FG = FD$

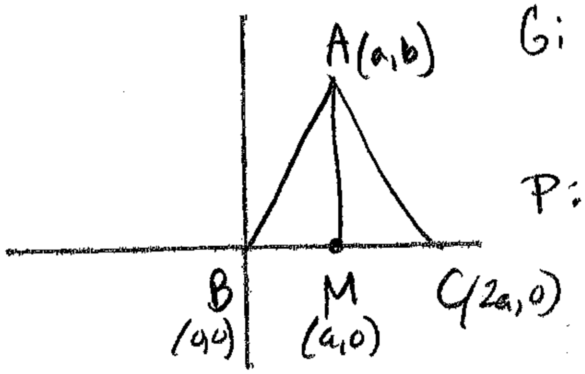
$FH = FC$

$GH = DC$

by def of $\cong$ $\overline{FG} \cong \overline{FD}$, $\overline{FH} \cong \overline{FC}$, $\overline{GH} \cong \overline{DC}$

$\triangle FGH \cong \triangle FDC$ by SSS ✓

8. Write a coordinate proof for the statement: ~~The measure of the segment that joins the vertex of the right angle in a right triangle to the midpoint of the hypotenuse is one-half the measure of the hypotenuse.~~



G: Isosceles $\triangle ABC$ (A is vertex angle)

M is the midpoint $\overline{BC}$

P: $\overline{AM} \perp \overline{BC}$

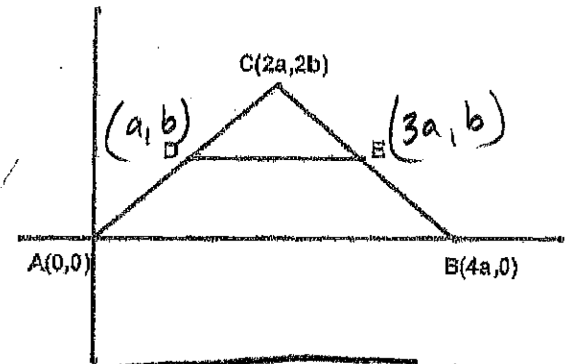
$\overline{AM} = m = \frac{b-0}{a-a} = \frac{b}{0}$ undefined

$\overline{BC}$ $m = \frac{0-0}{2a-0} = \frac{0}{2a} = 0$

$\overline{AM} \perp \overline{BC}$ b/c slopes opposite reciprocal. (or one is vertical + one is horizontal)

9. Given: $\overline{DE}$ is the midsegment of isosceles $\triangle ABC$.

Prove: $\overline{AD} \cong \overline{BE}$



$$AD = \sqrt{(a-0)^2 + (b-0)^2}$$

$$AD = \sqrt{a^2+b^2}$$

$$BE = \sqrt{(4a-3a)^2 + (0-b)^2}$$

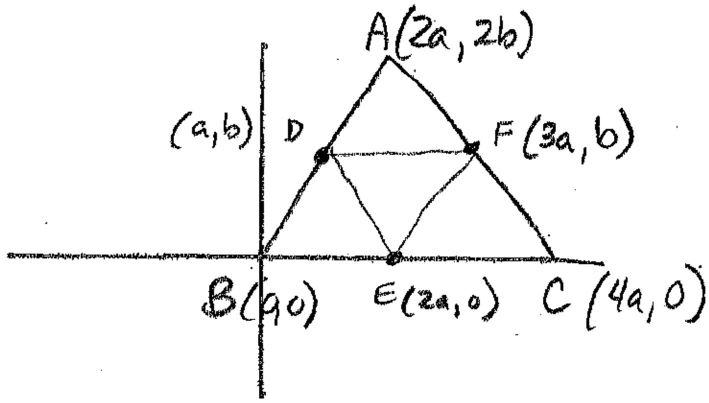
$$BE = \sqrt{a^2+b^2}$$

$AD = BE \therefore \overline{AD} \cong \overline{BE}$

10. Given: $\triangle ABC$ is isosceles.

$\overline{DE}$, $\overline{DF}$, and $\overline{EF}$ are midsegments of $\triangle ABC$.

Prove: $\triangle DEF$ is isosceles. (Draw your own diagram!)



$$DE = \sqrt{(2a-a)^2 + (0-b)^2}$$

$$DE = \sqrt{a^2+b^2}$$

$$FE = \sqrt{(3a-2a)^2 + (b-0)^2}$$

$$FE = \sqrt{a^2+b^2}$$

$$DF = \sqrt{(3a-a)^2 + (b-b)^2}$$

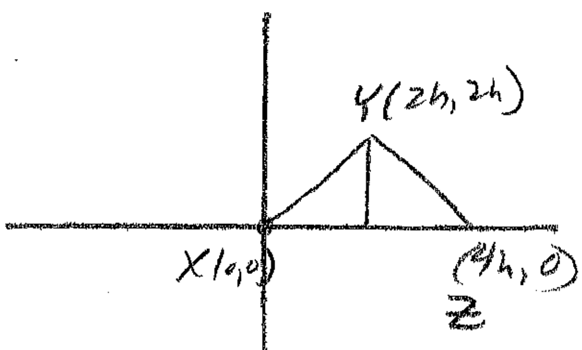
$(2a)^2$

$= DF = 2a$

$\triangle DEF$ is isosceles b/c $\overline{DE} \cong \overline{FE}$

Draw $\triangle XYZ$ and determine whether it is a right triangle.

11. X(0,0) Y(2h,2h) Z(4h,0)



$\overline{XY}$ $m = \frac{2h-0}{2h-0} = \frac{2h}{2h} = 1$

$\overline{YZ}$ $m = \frac{0-2h}{4h-2h} = \frac{-2h}{2h} = -1$

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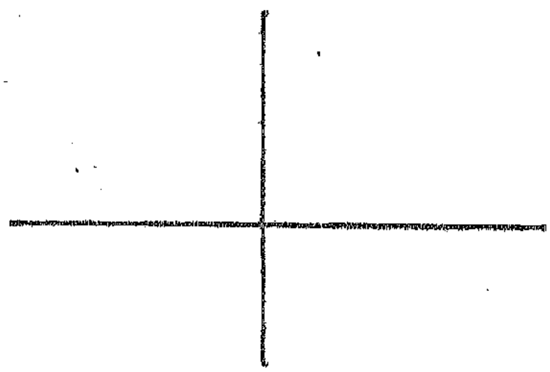
12. X(0,0) Y(h,h) Z(2h,0)



$\triangle XYZ$ is Right b/c $\overline{XY} \perp \overline{YZ}$

(slopes opp reciprocal)